ENSR

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August 3, 1990

Dr. Jorge J. Fernandez, President
Proteco
Avenue Hipodrome #614
Santurce, Puerto Rico 00909

Re: Work Plan for the Site Investigation Activities and Closure Plan Preparation

Dear Jorge:

ENSR is pleased to submit the attached work plan for the development of a closure and post closure plan for the Proteco Site in Penuelas, Puerto Rico. We are prepared to immediately execute this work plan. If we start the effort by August 30, 1990, a closure and post closure plan can be delivered to the Agency by about June 15, 1991. This time period includes our current estimate for additional field work.

In preparing this plan, we have strived to develop a concise text. Accordingly, we have omitted from the narratives the myriad of experiences and information which went into its derivation. Major task efforts will include:

- The compilation, review and interpretation of existing data and information.
- A field program appropriate to the results of the data review and interpretation.
- The design of a cost effective and environmentally sound closure/post closure plan.
- Timely and concise presentations to and discussions with EPA, Region II.

The work plan emphasizes that a most important effort is the review of the previous data. We have concerns about the magnitude of the field work; its scope may be reduced by the results of the data review. We have already had thoughts on how the site can effectively be closed; however, at least preliminary results of the field work are necessary before we can move forward in this area. Finally, along the way, we intend to gather and consider EPA input, but we must be frugal with the use of their time.

While ENSR has previously provided Proteco with a complete qualification statement, I feel it is appropriate to note to you that the key staff will be dedicated to this effort for its duration. Michael Moore will be task manager for the geological/hydrogeological portion of the work. Diane Heineman will be task manager for the closure/post closure plan. I will be Project Manager. Mark Haney will be Deputy Project Manager, and provide specific support with the EPA interface. This is a team of individuals who have previously worked together successfully.

We believe that this project will be complex from both an administrative and technical standpoint. At the inception of the effort, we will expand the included Primavera schedule into a full fledged project control and reporting system. This will provide us with the vehicles for good communication, schedule control and cost control.

ENSR looks forward to moving forward on this program. Please feel free to contact me if you have questions.

Very truly yours,

William Tambo

William Tambo, Ph.D.
Vice President

Mark Haney
Principal

ENSR Document No.: 51-WT-055

Enclosure

PROTECO Facility

Peñuelas, Puerto Rico

Work Plan for the Site Investigation Activities and Closure Plan Preparation

ENSR Consulting and Engineering

August 1990

Document Number 5541-001-120

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LIST OF FIGURES

1.0 INTRODUCTION/BACKGROUND

This workplan has been prepared for the Proteco facility in Penuelas, Puerto Rico. Its purpose is to provide a mechanism by which Proteco can arrange for necessary financial assurance and proceed to close and care for the existing and inactive waste management units at the Ponce facility. Specifically, this work plan sets forth the steps to develop final characterization of the site, and prepare the proper closure and post-closure plans.

Since 1980 Proteco has operated RCRA hazardous and industrial solid waste management units at the Penuelas, Puerto Rico facility. Historically, a large number of different types of wastes from many different sources were handled at the facility; the waste management units at the site have been used for storage of bulk liquids, drum storage, neutralization, immobilization, land treatment and drum burial.

Proteco had previously intended to appropriately close several of the existing waste management units, and obtain a Part B RCRA permit which would allow the site to continue to be used for hazardous waste disposal. However, more recently, Proteco has withdrawn its Part B application; the current business plan is to close and care for the existing and inactive waste management units, and to continue operations at the site as an industrial landfill.

Through the efforts of a previous consultant, Proteco conducted hydrogeologic site characterization and field studies to determine the nature and extent of waste management units. A RCRA Part B permit application and closure plans for the hazardous waste management units were prepared. Although significant amounts of time and money were expended in these efforts, EPA Region II reviewed the reports, Part B application, closure plans, and related technical documentation and found there to be significant deficiencies. Proteco received notices of deficiency (NODs) from U.S. EPA delineating the details of the inadequacy of the information previously supplied. The major themes of the NODs, related to hydrogeologic characterization and proposed closure, are as follows:

<u>Hydrogeology/Site Characterization Issues</u>

- Further definition of the site geology is required. Some additional data is required; however, ENSR does not fully agree with Hart's interpretation of the hydrogeologic setting. Most of the existing data is appropriate and useful - it needs to be assessed and reinterpreted.

- The hydrogeologic interpretation presented by Proteco's previous consultant has not provided accurate definition of ground water flow rates, and horizontal and vertical flow directions in all aquifers. No ground water contour maps were constructed from the existing data to facilitate the Region's review of information.

- The interpretation of geochemical data, as it has been presented, was lacking clarity and detail.

- The existing ground water monitoring system may not be accurately placed. The Region has commented that accurate definition of the uppermost aquifer and vertical interconnection of aquifers must be defined.

- The existing information interpretation and presentation has been deficient. The previous consultant's interpretations and observations have not always been supported by the data.

The plan of action that ENSR will follow with respect to hydrogeologic information and data will be to carefully review all existing data and information to form an independent interpretation. ENSR will then determine, based on the new interpretation, what additional data may be needed to develop closure plans and implement closure. ENSR will then conduct field investigations to collect such data.

Closure/Post-Closure Issues

- The previous closure plan relied on creation of new land disposal units. This was unacceptable to U.S. EPA since Proteco had been unsuccessful in permitting the existing units at the site.

- The closure plans did not provide detailed descriptions of the procedures for removing and transporting wastes, decontamination, disposal, sampling and the associated QA/QC and analytical procedures. The methods described were conceptual and much too general.

- Additional areas that the NODs focused on included the lack of detail and required information concerning the schedules and post-closure requirements.

- There was also a lack of supporting financial information to demonstrate that Proteco had instituted the appropriate financial assurance mechanisms.

Proteco did respond to the NODs through its previous consultant; however, these responses were judged inadequate by U.S. EPA. Finally, a new set of applications and plans were ordered by U.S. EPA. Enforcement actions are pending since Proteco had not been successful in addressing the NODs adequately. Proteco then decided to terminate its agreement with the previous consultant, hire a new consultant and attempt to avoid further legal issues related to hazardous waste management activities at the site.

Proteco retained the services of ENSR to provide consulting services related to the outstanding hazardous waste compliance issues at the site, and withdrew its Part B permit application. ENSR began its efforts by reviewing many documents prepared by the previous consultant related to the Part B permit application, closure issues and hydrogeologic characterization. An inventory of documents made available to ENSR is included in Appendix A. A meeting was held April 30 between Proteco representatives, U.S. EPA personnel, and the ENSR project team members. The purpose of the meeting was to introduce Proteco's new consultants, and to discuss information from prior efforts, the outstanding deficiencies, and Proteco's plans to move ahead and provide acceptable site characterization and closure plans. The meeting notes are included in Appendix B. These items form the basis for this work plan/plan of action. The intention of this document is to provide a mechanism by which Proteco can obtain financial assurance and proceed with efforts to characterize the site and close the waste management units in a sensible and cost-effective fashion acceptable to U.S. EPA.

The Work Plan has been organized in the following fashion: Section 2 contains an approach for conducting a detailed review of all available data; Section 3 describes plans to conduct additional site characterization studies to provide information that is lacking relative to the hydrogeologic setting as well as to collect data to support the closure effort. In Section 4, the approach to developing the closure plans is described. A schedule for completion of these activities is in Section 5.

2.0 DATA REVIEW

The data review is the crucial first step of the proposed scope of work and is expected to produce two important products. One will be a comprehensive summary of all available information and interpretations completed by the previous consultants or any other significant party. This summary will be arranged into one functional document. The second product will be any new interpretations of existing information which have been specifically requested by the agency in the Notices of Deficiency (NODs), or considered necessary by ENSR to complete this effort.

This section describes why the data review is considered necessary, what the scope of the review will include and how the review will proceed.

2.1 Importance of Data Review

Significant investigative work on the Proteco site has been carried out over a number of years. The resulting data is contained in numerous reports. Before any decisions are made on further data collection or development, all available data should be collected, listed and reviewed. This will help guide future actions and result in a more time and cost effective characterization effort.

In parallel with collection of available data a compendium of available interpretations should be formulated. This compendium would provide the extent to which the data was used to its potential. It may be possible to obtain more information from existing field data than has previously been acquired. For example, ENSR's cursory review of the data revealed only scant interpretation of a great deal of water level and geochemical data.

The data and interpretation summary will be compared to the deficiencies called out by U.S. EPA in order to further delineate the requirements for further field investigation work. Following the review of these documents, an accurate understanding of the scope of essential field work should be realized.

2.2 Scope of Data Review

Three sources will be investigated to complete the existing data package: 1) U.S. EPA Region 2 files, 2) Proteco records and 3) Previous consultants' files. ENSR has already obtained an extensive but an apparently incomplete set of documents from Proteco which are listed in Appendix A. ENSR anticipates continuing its data search at the U.S. EPA Region 2 offices for a copy of all official documentation submitted by Proteco and its previous consultants.

Proteco personnel have already turned over a great number of documents to ENSR and are proceeding to assure that all relevant information is provided as soon as possible. Proteco has also requested its previous consultants to make available to ENSR all reports and files related to the Ponce site.

2.3 Data Review Procedure

The first step in the data review process will consist of a trip to the U.S. EPA Region 2 offices in New York City and the offices of the previous consultants. All documentation concerning the Proteco site which is not already in ENSR's files will be copied and recorded for reference. A crosscheck will be made with Proteco and previous consultants to assure that no documentation is missing form the record.

Following the compilation of the data and interpretation lists discussed above, an expected list of questions concerning any missing data or the deficiency of data on file will be addressed. For example, it will be important to establish the methods of data collection and quality of data to assure the data relevance to specific questions. The methods and quality may not be clearly established in the documentation, but may be explained by field notes not made available to ENSR. These questions will be addressed by interviewing Proteco staff and the staff of the previous consultants which had direct involvement with prior investigations.

All finalized lists of data (and actual existing data) as well as interpretations will be categorized according to subject, document of origin and dates collected. Each subject category of data will contain a summary of the collection and/or analytical method, the actual data in chronological order and a summary of interpretations from previous consultants on that particular data set. This organized document of information will allow for a more efficient data review by ENSR technical staff specialists.

The organized data will be reviewed by a set of ENSR technical staff specialists. ENSR will address the deficiencies noted by U.S. EPA while developing recommendations for any additional investigatory work at the Proteco site. ENSR will produce tables and maps of

important data, if they do not exist from previous reports. Important data will be defined as data noted by U.S. EPA as deficient, or considered by ENSR as relevant in answering noted deficiencies or planning additional characterization efforts.

In summary, the final data review product will provide a more extensive interpretation of existing data, which will answer some of the U.S. EPA NODs and provide recommendations for additional field work to address other deficiencies. While ENSR's review product will not be a response to each NOD, all deficiencies of previous work will be addressed in the closure and post closure plan document. The primary deficiencies to be addressed are those which ENSR considers relevant to providing the necessary information for developing closure plans for and conducting closure of waste units. Answering some of the deficiencies before any additional field work is completed is assumed to be possible based upon the initial cursory review of documentation by ENSR. The existing documents appeared to contain some of the essential information but it was inadequately presented. A mutual understanding of the primary deficiencies from previous work has been achieved through discussions and meetings between Proteco, U.S. EPA and ENSR. Following data review and interpretation, a workplan will be completed for ENSR staff to observe in the field to assure that all work is executed as specified and all necessary information is collected quickly and efficiently.

3.0 ADDITIONAL HYDROGEOLOGICAL/GEOLOGICAL AND SITE CHARACTERIZATION

3.1 Hydrogeological/Geological Characterization

The primary categories of deficiencies in the geologic and hydrogeologic characterization noted by U.S. EPA and by ENSR based on a site visit and preliminary data review include:

- geologic interpretation;
- hydrogeologic interpretation;
- geochemical interpretation;
- saturated and unsaturated zone monitoring; and
- data interpretation and presentation.

The site specific geology does not appear to have been presented accurately while the extensive information available on the regional geology was not understood or completely applied. In addition, the geologic investigation may have been too focused on localized areas before the larger picture of site geology was understood.

Concerning the site hydrogeology, the noted deficiencies requested more accurate definition of flow rates and direction, and vertical and horizontal hydraulic interconnection between geologic units. The most basic information for assessment of a groundwater flow system, water levels, was apparently not fully applied.

Geochemical information is usually beneficial for the definition of hydrogeologic interconnections or lack thereof. It appears from the limited interpretation by the previous consultant, that the geochemical data was not considered as advantageous information.

Placement of monitoring instrumentation and methods of monitoring was not entirely appropriate for the saturated or unsaturated geologic media on the site.

The interpretation and presentation of data collected at the site does not appear to be complete. A brief data review by ENSR revealed no presentation of extensive water level data and limited to no interpretation of geochemical data. Summary maps and tables of the extensive field data collected over many years do not appear to be available or even completed.

ENSR expects some of the deficiencies on groundwater monitoring, an understanding of the contaminant flow pathways and basic hydrogeology to be resolved by a more complete interpretation and presentation of the available data. However, further field investigation work is expected due to specific deficiencies referenced by U.S. EPA and anticipated requirements for a complete hydrogeologic interpretation.

Some of the field investigative tasks which may be necessary to satisfy the general categories of deficiencies discussed above may include but not be limited to:

- Geology - surface and downhole geophysics and a limited number of continuously logged borings:
- Hydrogeology - in-situ slug test and laboratory tests on soils for hydraulic conductivity values, piezometric maps and gradients from additional water levels and limited isotopic and geochemical analyses for aquifer delineation;
- Geochemistry - as discussed above along with samples of the unsaturated zone to distinguish waste units and unsaturated zone connection with aquifers;
- Monitoring - additional monitoring wells necessary for regulatory compliance, further waste unit delineation and hydrogeologic characterization.

These possible data requirements are only presumed and will be discussed and outlined in greater detail following the detailed data collection and review.

3.2 Site Characterization Requirements for Closure

The primary deficiencies noted in the site characterization for closure requirements were lack of waste unit delineation and insufficient monitoring network for all units. The expected field work to satisfy these deficiencies may include:

- test pits for waste unit delineation to provide a boundary for possible cap designs;
- waste and soil sampling for a more complete waste characterization;
- borings around waste units to support cap designs, and;
- a sufficient number of monitoring wells up and downgradient of each designated waste unit.

Following the data review, a more accurate interpretation of the requirements for waste unit delineations will be accomplished.

4.0 CLOSURE/POST-CLOSURE PLANS

In developing the closure/post-closure plans, the first step will be to review all available existing data related to closure. The data will include details about the waste management units - ages, sizes, types of wastes managed, characterization of wastes and of the underlying and surrounding geologic materials to support closure design. The procedures for the in-depth data review have been described in Section 2 of this work plan. Any information that this is still needed to support closure/post-closure plans after the data review will be collected during the site characterization described in Section 3.

A. General Approach

The general approach to closure will consist of phased closure beginning with the units that pose the greatest potential threat to the environment. In this way, the areas requiring the most attention will be addressed first; this method will also facilitate Proteco's arrangement of the financial resources to conduct the closure.

Proteco will attempt to clean close several of the units; the remaining hazardous waste units will be closed in place fulfilling the regulatory requirements for closure as a landfill, and conducting 30 years of post-closure care and monitoring.

Proteco will also attempt to combine two or more units under a single cap structure. This approach will provide a margin of additional assurance by capping buffer areas between the units; it will also facilitate post-closure monitoring since the units combined under one cap can be monitored as a single unit.

Any unit being closed independently will be the subject of its own closure plan. Units being closed in combination with one or more other units under a singular cap structure will be included in a single closure plan which will address all units under the cap. Proteco anticipates the preparation and submittal to U.S. EPA of nine separate closure plans for final closure of this facility.

All closure and post-closure efforts will be conducted in accordance with 40 CFR Part 265 Subpart G - Closure and Post Closure and the applicable portions of Subparts I, J, K, M and N.

B. Detailed Approach and Methods

Determination of Clean Closure Option

As an initial step in deciding if clean closure can be achieved, there must be verification that the ground water associated with the land based units has not been contaminated. As part of the field effort, described in Section 3, existing wells will be sampled, where appropriately located, or new wells will be installed during the additional field characterization effort.

Clean Closure of Units

Based on the review of data available at this time, Proteco plans to attempt clean closure of the following units:

Unit 4 - Drum Storage Area
Unit 7 - Neutralization Impoundment
Unit 13 - Rainwater Lagoon
Unit 15 - Lindane Tank
Unit 17 - Neutralization Impoundment

The Closure Plan will contain detailed descriptions of the following closure activities:

- waste characterization to determine disposal options;
- waste removal;
- waste transport;
- procedures for treatment, storage or disposal of hazardous wastes;
- identification of off-site facilities to be used;
- decontamination of structures and equipment used during closure;
- sampling and analytical methods for testing the surrounding and underlying soils after waste removal;
- backfilling and grading of the excavated areas;
- procedures to minimize run-on/run-off during closure;
- schedule for closure activities;
- closure certification; and
- closure costs.

Region 2 has requested ground water monitoring for the clean closed units on a quarterly basis for three years after closure. Although this is not required in the Federal Regulations, it is apparently Region 2 and EQB policy. The placement and design of existing wells will be

assessed during the data review to determine if any may be appropriate for post-closure monitoring. Additional wells will be placed as part of the field effort, if necessary.

The closure plan will contain sufficient detail to fulfill the regulatory requirements as well as serve as a document that will guide in implementation of the closure, i.e., procuring materials and contractors to assist with closure activities and implementing the closure in the field.

Closure of Units in Place

Units that will not be clean closed at the Proteco facility, will be closed in place. Waste will remain in the units and they will be capped, with the exception of Unit 9 - the Oil Lagoon. This unit will have the oily liquids removed prior to capping to minimize the potential for the oily waste to act as a source of contamination after closure.

The portions of the closure plan describing closures in place will contain detailed descriptions of the following closure activities:

- determination of extent and characteristics of wastes/units;
- characterization of materials underlying and proximal to the waste management units to support cap design;
- determining cap specifications based on the characteristics of the areas to be capped;
- plans to obtain materials for cap construction; and solidification of wastes, where necessary;
- plans to install caps, prepare cover area, and grade;
- decontamination of structures and equipment used during closure;
- schedule for closure activities;
- closure certification;
- preparation of a survey plat; and
- closure costs.

The units that are closed in place will require ground-water monitoring throughout the post-closure period. The components of the post-closure monitoring plan are described in the following section.

C. Post-Closure Plan

For the units that will be closed with wastes remaining in place, a post-closure plan must be developed. Post-closure care will commence immediately upon completion of closure activities

and will continue for 30 years after the date that final closure is certified. The plan consists primarily of the following:

1) ground water monitoring and reporting;

2) inspection and maintenance of monitoring wells, the cover units, site security, and run-on/run-off drainage control structures;

3) maintaining the name, address and phone number of a person or office to contact for matters concerning the facility during the post-closure period; and

4) surveying and registering the site as a disposal area for hazardous wastes.

Ground-Water Monitoring Plan

In accordance with the requirements of 40 CFR Part 265.117, ground water monitoring must be conducted throughout the 30-year post-closure care period. The number, location and design of the monitoring wells that will be used to monitor ground water during the post-closure care period will be determined through a combination of review of the existing site data and filling in any missing information during the field effort to further the site hydrogeologic information.

In general, the wells to be monitored during the post closure care period must be installed at appropriate depths and locations to represent:

- background samples not affected by a potential release from the facility; and
- the quality of ground water downgradient of the water management units.

In order to properly locate the wells, the hydrogeologic information must define the following:

- site stratigraphy, including the presence and physical/chemical properties of any confining layers;
- the uppermost aquifer and its hydraulic interconnection with any underlying units;
- horizontal and vertical components of ground water flow at the site;
- hydraulic conductivity of the uppermost aquifer;
- the downgradient limit of the waste management areas; and
- any seasonal or temporal variations in ground water levels.

Much of this information has already been obtained through previous field efforts. Some of the existing wells may be used as part of the monitoring system, provided that they have been

properly constructed, the integrity of the wells has been maintained, and they are capable of yielding representative samples.

Since some of the units will be closed in place under a common cap, Proteco proposes to monitor each single capped structure with a single ground water monitoring system. The monitoring wells must be designed and installed in such a fashion that representative ground water samples are obtained and that aquifer cross-contamination does not occur. At a minimum, all monitoring wells will be cased in a manner that maintains the integrity of the monitoring well bore hole. This casing will be screened at an appropriate depth and packed with gravel or sand, where necessary, to enable collection of ground water samples from the uppermost aquifer. The annular space (i.e., the space between the bore hole and well casing) above the sampling depth will be sealed with a cement bentonite mixture to prevent contamination of samples and the ground water.

The ground-water monitoring plan will contain procedures for obtaining and analyzing samples from the ground water monitoring system. Since consistent sampling and analysis procedures are necessary to ensure the validity of ground water monitoring data, the following items will be considered individually in Proteco's ground water monitoring plan:

- sample collection - protocol and frequency;
- sample preservation and shipment;
- analytical procedures; and
- chain-of-custody.

The goal of this program is accurate measurement of ground water movement and detection of potential hazardous constituent releases.

Proteco's ground water monitoring plan will contain an outline of a ground water quality assessment program, as well as plans for recordkeeping and reporting and all notifications to the regulatory agencies that are required during post-closure monitoring.

Post-Closure Care

The plan will contain detailed descriptions of Proteco's plans to conduct inspection and maintenance of the following site features:

- monitoring wells;
- final cover structures;
- run-on/run-off control structures, including ditches and berms;

- site securing structures such as fences, gates and signs; and
- surveyed benchmarks.

In addition, the plan will include descriptions of the appropriate person/office to contact during the post-closure care period as well as notices to the government authorities and property deeds and records that the property has been used to manage/dispose of hazardous wastes, that the final cover system should never be disturbed, and the use of the property is restricted.

Finally, the plan will contain a cost-estimate for post-closure care that will include the costs of ground water monitoring.

5.0 TASK DESCRIPTIONS AND SCHEDULE

This section presents a schedule for conducting the work described in this document. The following is a breakdown by tasks of the items to be completed as part of the program. The tasks have been keyed into the logic diagram shown in Figure 5-1, and the bar chart schedule, shown in Figure 5-2.

Task 1 - Project Organization

The general purpose of this task is to address the organizational aspects and staffing of the effort. The Primavera Schedule will be expanded into a full set of tasks, a work breakdown structure and a manpower loaded schedule. A reporting and invoicing format will be derived and agreed upon. Technical and administration staff will be selected, assigned and oriented. A communication network will be arranged. Project files will be organized. The client will be conferred with either by conference call or visitation. An EPA kick-off meeting will be considered.

Task 2 - Data Collection

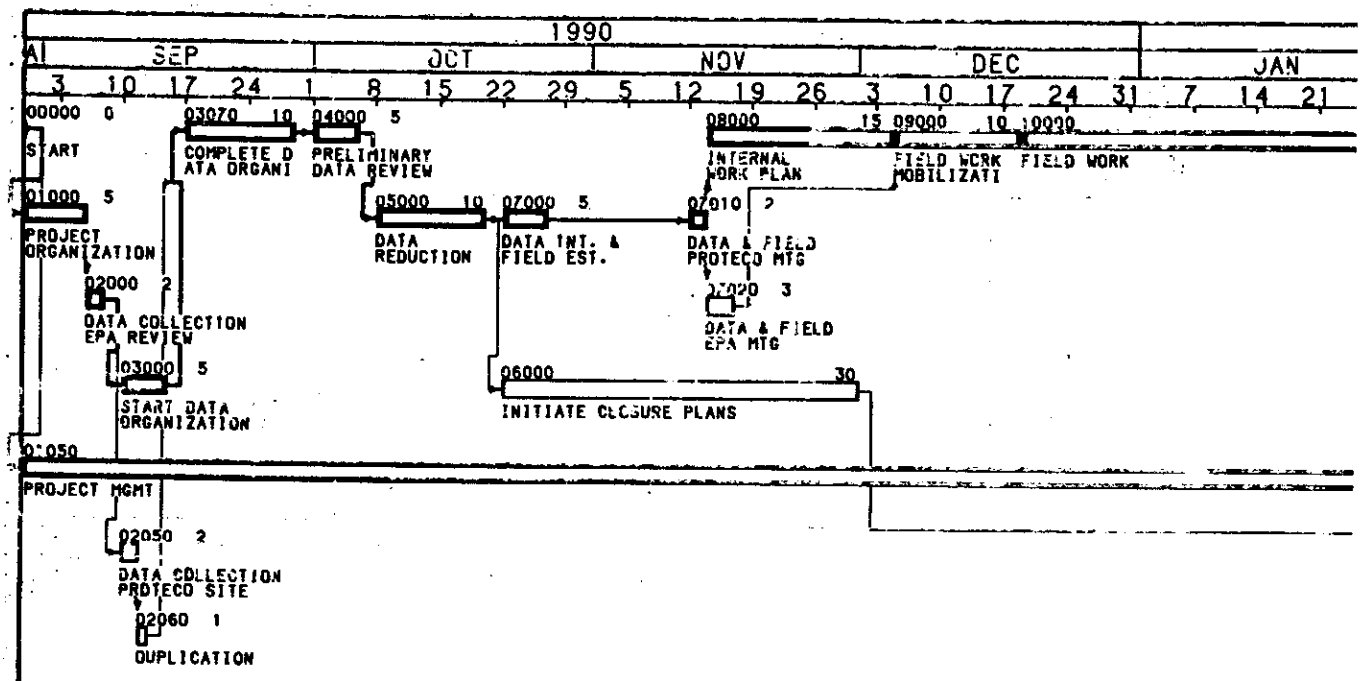
This includes one trip to U.S. EPA Region 2 offices and possibly to the previous consultant office to collect appropriate files. Following file and document collection, there may be one trip to the Proteco site for a site walk and file review. This task may also include numerous telephone conversations to find any missing data. All documentation will be copied, categorized and returned.

Task 3 - Data Organization

Summarize data and interpretations into one working document. This will begin with a review of data collection and analytical methods, and be followed by expected discussions with previous consultants and Proteco to answer any questions concerning the data and its' interpretation.

Task 4 - Preliminary Data Review

An initial review of the work document, of data and interpretations, to note immediate flaws or secondary requirements for additional data reductions into necessary maps and/or tables. Regular meetings will be held among technical staff to review the findings.

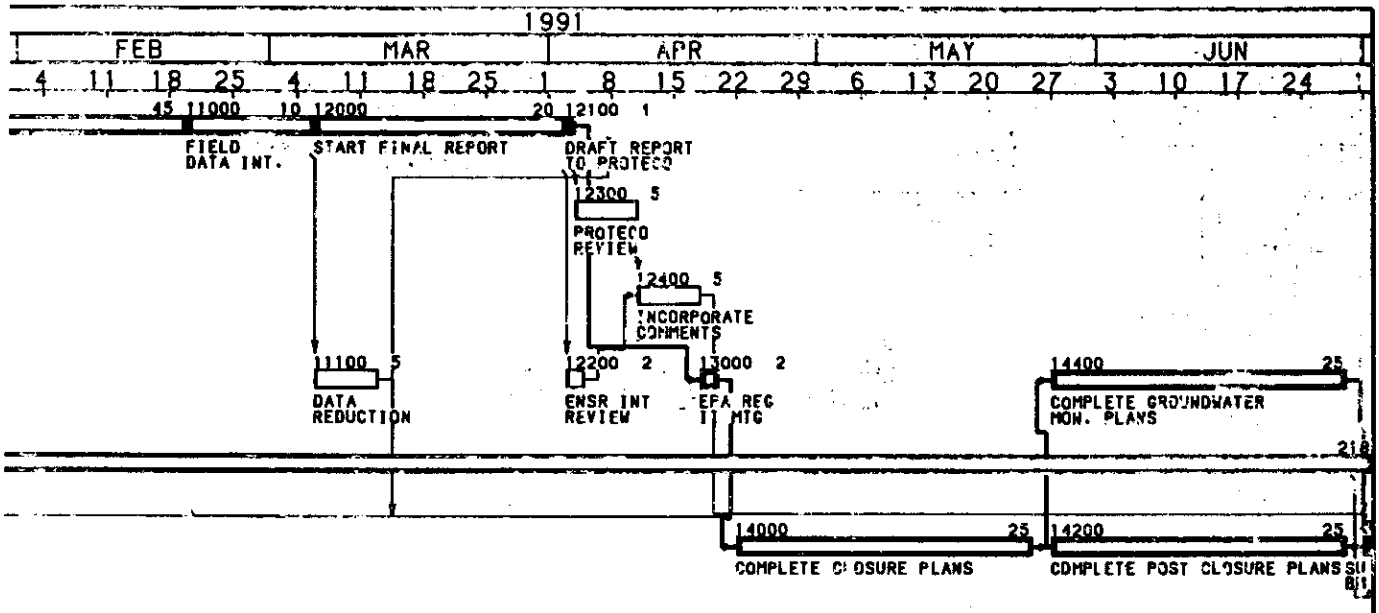


act id rd
description
Activity Bar/Early Dates
Critical Activity
Progress Bar

Primavera Systems, Inc. 1984-1989

PROTEC
LA
TIME-SCALED

Project Start : 30AUG90
Project Finish: 1JUL91



LANDFILL
FILL
OGIC DIAGRAM

Sheet 1 of 1

Data Date: 30AUG90
Plot Date: 1JAN80

Date	Revision	Checked	Approved

Task 5 - Data Reduction

This task will fulfill the requirements from the Preliminary Data Review by reducing large quantities of data into maps and easy to use tables. The maps and tables will be incorporated into the final report.

Task 6 - Initiate Preparation of Closure Plans

During this task ENSR will begin to prepare closure plans for the areas of most environmental concern, mainly these will be clean closures.

Task 7 - Data Interpretation and Field Work Estimation

Includes a finalized data review with a complete set of maps and tables. This review will be completed with conclusions from further interpretative efforts beyond previous work and recommendations for additional field work. These conclusions and recommendations will be discussed in meetings among ENSR technical staff followed by a meeting with Proteco then with the U.S. EPA.

Task 8 - Internal Work Plan

The agreed upon field work approach will be described in greater detail in a work plan that will be used internally by ENSR staff to plan and carry out the proposed field work. This work plan will include ENSR standard operating procedures and other information necessary to carry out the field work. It will be sufficient to allow contracting, and to run the effort.

Task 9 - Field Work Mobilization

Final plans regarding specifications for subcontractors and mobilization of field equipment and staff will be completed. Final contracts with subcontractors will be completed and all necessary field eqipment will be acquired.

Task 10 - Field Work

This task will include all field work and sampling agreed upon in Task 7. This task will also include laboratory analytical work, travel of all field personnel to the site, rental and handling of field equipment and coordination and oversight of all subcontractor work.

Task 11 - Data Interpretation

All data collected and analyzed from Task 10 will be reduced to tables and maps followed by interpretations and conclusions.

Task 12 - Report Publication

The conclusions reached in Task 11 will be incorporated with previously collected data and combined into one interpretative report. This report will also include all conclusions from the data review incorporated into the findings of the field investigation.

Task 13 - Meeting with Region 2

This task will consist of a meeting at Region 2 offices in New York to discuss the findings of the field program and the closure strategy. ENSR technical and management staff involved with the project will attend as well as representatives from Proteco.

Task 14 - Continue Preparation of Closure Plans/Post-Closure Plans/Ground Water Monitoring Plans

This task will consist of continued preparation of the closure plans following from Task 6. This will be the in-place closures which will also require post-closure plans and ground water monitoring plans.

Task 15 - Internal Review/Client Review/Final Report Production (Closure Documents)

Under this task the closure documents will undergo senior technical review by ENSR staff as well as review by Proteco. Appropriate comments/changes will be incorporated and the final document prepared for delivery to Region 2.

For the preliminary Primavera graphics, a start date of August 30, 1990 has been selected for illustrative purposes. The project duration is calculated at 10 months. A closure plan can be delivered at the end of June, 1991.

Figure 5-1 is a logic diagram. It is keyed into the major task descriptions, and shows the task dependencies, one on the other. Start date, dependencies and elapsed time for each task are inputs to the software which derives the logic diagram. Individual task locations in the schedule and total elapsed time are an outputs. Figure 5-2 simply arranges the logic diagram into a more

conventional and familiar sequential bar chart. The bar chart is normally used as a tool for project schedule control.

At the inception of the effort, the schedule will be refined and expanded into subtasks. A detailed work break down structure will be derived (a set of detailed task and subtask description), along with a manpower loaded schedule, which allows cost tracking. This more detailed version of the Primavera system will be used for project control and to derive a reporting format. In the future, the system and schedule may be extended to include actual closure efforts.

APPENDIX A
INVENTORY OF DOCUMENTS

January 16, 1990
Prepared by T. Cormier
for Project Proteco
Updated January 25, 1990

Inventory of Documents ENSR received from Proteco

Documents received the week of 1/7/89. The following is a list of all documents received by ENSR from Proteco:

1. Phase IA Hydrogeologic Investigation
Protecction Tecnica Ecologica, Inc. (Proteco)
Ponce, Puerto Rico Volume I
Prepared by: Fred C. Hart Associates, Inc.
Penn Center West III, Suite 106
Pittsburgh, PA 15276; February, 1987

2. Proteccion Tecnica Ecologica (Proteco) Inc.
Part B Permit Application; PRD 091018622
Penuelas, Puerto Rico
Volume 1; Revision 2; Signifies changes made in Revision 1, submitted March 17, 1986; Revision 2: June 30, 1986
Dated: June 30, 1986

3. Proteccion Tecnica Ecologica (Proteco) Inc.
Part B Permit Application; PRD 091018622
Penuelas, Puerto Rico
Volume 3; Revision 2; Signifies changes made in Revision 1, submitted March 17, 1986; Revision 2: June 30, 1986
Dated: June 30, 1986

4. Phase IA Hydrogeologic Investigation; Proteccion Tecnica Ecologica, Inc. (Proteco) Ponce, Puerto Rico
Volume 4: Appendix I
Prepared by: Fred C. Hart Associates, Inc.
Penn Center West III, Suite 106
Pittsburgh, PA 15276; February, 1987

5. Proteccion Tecnica Ecologica (Proteco) Inc.
Part B Permit Application; PRD 091018622
Penuelas, Puerto Rico
Volume 4; Revision 2; Signifies changes made in Revision 1, submitted March 17, 1986; Revision 2: June 30, 1986
Dated: June 30, 1986

6. Proteccion Tecnica Ecologica (Proteco) Inc.
Part B Permit Application; PRD 091018622
Penuelas, Puerto Rico
Volume 5; Revision 2; Signifies changes made in Revision 1, submitted March 17, 1986; Revision 2: June 30, 1986
Dated: June 30, 1986.

7. Proteco Facility Part B Application; Response to Remaining Issues and Special Permit Conditions; Letter to Mr. Walka: Dated May 27, 1987; Copies of the following:

A Response to Regulatory Questions on Part B Application
B A Draft of Special Permit Conditions
C Part B Application Revision No. 4
D Technical Specifications for the Proposed
E Response Action Outline
F Sketch of Unit 16 Final Grading Plan
G June 5, 1986 Letter from R.M. Walka to Dr. J.J. Fernandez
Re: Unit #17
H May 15, 1987 Memorandum from J.E. Negron to G. Brown
Re: Coordination Agreements

8. Hydro Phase III - Work Plan
Proteccion Tecnica Ecologica (Proteco) Inc.
Prepared by: Fred C. Hart Associates, Inc.
Penn Center West III, Suite 106
Pittsburgh, PA 15276; July, 1986

9. Geotechnical Evaluation for Proteccion Tecnica Ecologica (Proteco) Inc.
Prepared by: Fred C. Hart Associates, Inc.
Penn Center West III, Suite 106
Pittsburgh, PA 15276; August 30, 85 Prepared by: Tobias and approved by: Alan E. Briggs

10. Document no cover page; table of contents;
1.0 Introduction through 9.0 Work Plan Deviations

11. Proteccion Tecnica Ecologica (Proteco) Inc.
Phase II - Hydrogeologic Studies; Assessment of Surface Water
Prepared by: Fred C. Hart Associates, Inc.
Penn Center West III, Suite 106
Pittsburgh, PA 15276; February 12, 1988

12. Phase III Soils Investigation
Protecction Tecnica Ecologica, Inc. (Proteco)
Ponce, Puerto Rico Volume II
Prepared by: Fred C. Hart Associates, Inc.
Penn Center West III, Suite 106
Pittsburgh, PA 15276; February 12, 1988

13. Phase III Soils Investigation
Protecction Tecnica Ecologica, Inc. (Proteco)
Ponce, Puerto Rico Volume III
Prepared by: Fred C. Hart Associates, Inc.
Penn Center West III, Suite 106
Pittsburgh, PA 15276; February 12, 1988

14. Protecction Tecnica Ecologica, Inc. (Proteco)
Field Operations Work Plan for Phase 1A;
Hydrogeologic Studies Revised
Prepared by: Fred C. Hart Associates, Inc.
Penn Center West III, Suite 106
Pittsburgh, PA 15276; April 4, 1986

15. Phase IA Hydrogeologic Investigation
Protecction Tecnica Ecologica, Inc. (Proteco)
Ponce, Puerto Rico Volume 2: Appendix A
Prepared by: Fred C. Hart Associates, Inc.
Penn Center West III, Suite 106
Pittsburgh, PA 15276; September, 1986; Stamped Sept. 30, 1986

16. Phase IA Hydrogeologic Investigation
Protecction Tecnica Ecologica, Inc. (Proteco)
Ponce, Puerto Rico Volume 3: Appendicies B-F
Prepared by: Fred C. Hart Associates, Inc.
Penn Center West III, Suite 106
Pittsburgh, PA 15276; September, 1986; Stamped Sep. 30 1986

17. Hydrologic Study of Proposed Project for "Servicios Carbareon"
Prepared by: Jordache Construction, Inc.; Abiud Reyes, P.S.
Mario Soriano, P.E.; Dated June 1985

18. Memorandum; Ground Water Level Determination; Industrial Wastes Disposal Yard; Valdivieso Farm; Tallaboa, Puerto Rico
Jaca, Sierra & Rivera
Soil Consulting Engineers
Box 198 Sta. 6
Ponce, Puerto Rico 00731

19. Memorandum #5; Additional Ground Water Level; Determinations and Other Field Test Results, Industrial Wastes Disposal Yard, Valdivieso Farm; Tallaboa, Puerto Rico
Jaca, Sierra & Rivera
Geotechnical Engineers and Testing Laboratories
Box 198 Sta. 6
Ponce, Puerto Rico 00731
Tel. (809) 843-6538

20. Memorandum; Additional Ground Water Level Determinations and Other Field and Laboratory Test Results Industrial Wastes Disposal Yard; Valdivieso Farm; Tallaboa, Puerto Rico
Jaca, Sierra & Rivera
Soil Consulting Engineers
Box 198 Sta. 6
Ponce, Puerto Rico 00731

21. December 1987 Sampling and Analysis of Reef Limestone Wells and Well 36WS-86

22. First Monthly Sampling for Existing Unit Monitoring Points

23. Shallow Alluvial Water Bearing Zone Analytical Data

24. First Quarter 1988 Sampling Data for Interim Status Monitoring Wells

25. Phase 1A Analytical Data

26. Unit 9 Investigation Work Plan
Protecction Tecnica Ecologica, Inc. (Proteco)
Ponce, Puerto Rico
Prepared by: Hart Engineers, Inc.
1110 Vermont Avenue, N.W., Suite 410
Washington, D.C. 20005; Dated September 23, 1988

27. Technical Memorandum Source/Pathway Investigation of the Extent of Waste Constituent Migration From Proteco Unit 9 (The Oil Lagoon)
Prepared by: Hart Engineers Inc.
Penn Center West III, Suite 106
Pittsburgh, PA 15276; June 28, 1988

28. Certified Letter; Re: Notice of Deficiency (NOD)
Interim Status Closure Plans; Part B Permit Application; Ground Water Monitoring Plans; EPA I.D. Number: PRD91018622

29. Attachment I; Comment Sheet; Interim Status Closure Plan Review [40 CFR Part 265]

30. Attachment II; Proteco Part B Application Comments; Section B

31. Attachment III; Ground Water Monitoring Deficiencies; Hydrologic Study Needs

32. Protecction Tecnica Ecologica, Inc. (Proteco) Existing Unit Closure Plan; Revised May 1, 1986

33. Letter to US EPA 2/26/88; Re: Proteco Facility Updated Closure Plan (Revision #3); Consnet Agreement Item No. 4B, and 13C;Existing Unit Closure Plan - Revison 3; February 26, 1988; Existing Unit Closure Plan; Revised May 1, 1986; Revision 2 - September 30, 1986

34. Hydrogeologic Conditions at Carbareon Waste-Disposal Site; By Mario Soriano Ressy; Geological Engineer; August 1983

APPENDIX B
MEETING NOTES

MEETING NOTES

PROJECT NO. 5541-001-110

On Monday, April 30, 1990 a meeting took place at EPA Region II to discuss the status of the Proteco Site in Puerto Rico. The meeting attendees were as follows:

John Gorman, EPA Region II, Hazardous Waste Compliance
Phillip Flax, EPA Region II, Hazardous Waste Compliance

Rene' Rodriguez, Proteco, Compliance Manager
Ivelisse Estrada, Proteco, Vice President

Dr. William Tambo, ENSR, Vice President, Project Manager
Michael Moore, ENSR, Hydrogeology/Site Characterization
Diane Heineman, ENSR, Regulatory Compliance, Closure/Post Closure

The meeting consisted of three main portions: 1) general discussion; 2) discussion of hydrogeology and site characterization issues; and 3) discussion of closure/post-closure issues. The following sections summarize the discussions related to each of the three areas.

General Discussion

Dr. Tambo began by defining the objectives of the meeting: 1) To agree on what EPA wants and 2) To establish lines of communication and a basis for setting up more meetings with EPA.

ENSR plans to put together a proposal within 30 to 90 days to describe the plan of action for closure to take place - it will be a work plan form of document.

John Gorman expressed EPA's frustration and stated that EPA is still enforcing NODs from last year. The Region is not willing to discuss schedules at this point because of the existing enforcement requirements - this was in response to ENSR's statement that a preliminary time frame for completion of the closure plans would be approximately six months.

John Gorman is the technical contact for this project, even though as Section Chief he has other responsibilities. The Region is attempting to fill the position of Permit Writer that John vacated.

John Gorman stressed the importance of Proteco presenting evidence of financial assurance up front - this is the most important issue. The Region may not even review closure plans to be submitted if financial assurance is not demonstrated up front.

EPA expressed an apprehension in having too many additional meetings on the Proteco project. John Gorman felt that enough man-hours have been spent by EPA at this point.

John Gorman requested that prior to any meetings or presentations by ENSR that information be forwarded to the Region for review first.

Hydrogeology/Site Characterization Issues

The discussion summarized the deficiencies in the previous site characterization and ground water monitoring efforts.

Further definition of the site geology is required. Some additional data is required; however, ENSR does not fully agree with Hart's interpretation of the hydrogeologic setting. Most of the existing data is useful - it needs to be assessed and re-interpreted.

The existing hydrogeologic interpretation (Hart) has not provided accurate definition of ground water flow rates, horizontal and vertical flow directions in all aquifers. No ground water contour maps were constructed from the existing data to facilitate the Region's review of information.

The interpretation of geochemical data, as it had been presented, was lacking.

The existing ground water monitoring system may not be accurately placed. The Region has commented that accurate definition of the uppermost aquifer and vertical interconnection of aquifers must be defined.

John Gorman and Phil Flax (hydrogeologist) agreed that the existing information interpretation and presentation had been deficient. Hart's interpretations and observations were not always supported by the data. The Region sometimes had the impression that there was additional information that was not being presented.

The plan of action that ENSR will take with respect to hydrogeologic information and data will be to review all existing data and information to form an independent interpretation and determine, based on the new interpretation, what additional data may be needed.

ENSR also stressed that the new reports produced by ENSR would be more complete, organized and easy to follow and would not simply be a reorganization of the Hart reports.

Closure/Post-Closure Issues

This portion of the meeting presentation focused on a summary of NODs related to the previously submitted closure/post-closure documents and included a discussion of ENSR's proposed approach to closure of the units at Proteco, as well as some questions related

to EPA's comments. The first portion of the discussion summarized ENSR's impressions of the NOD's as follows:

- The NODs focus on a lack of detail and information to support the closure. Methods of removal, transportation, disposal, decon, cost estimates, etc. were conceptual and much too general.

  - ENSR will provide detailed description of all phases of closure.

- Previous closure plan relied on creation of new land disposal unit which was unacceptable to EPA.

  - Closure proposed by ENSR will not rely on any proposed new units.

- Must provide detailed description of procedures for removing wastes, decontamination, sampling - associated QA/QC and analytical procedures.

  - The new closure plans will contain the required level of detail.

- Additional deficiencies concerning schedules - lack of detail and required information - and post-closure requirements. Lack of supporting financial information - closure plan must have copies of appropriate financial assurance mechanisms.

John Gorman concurred with our impressions about the NODs.

Questions which were posed relative to the closure/post-closure/NODs included:

- Was detailed analyses of the hazardous wastes requested to determine parameters for ground water monitoring?

  John Gorman said that there was not, in some cases, full information concerning the types/amounts of wastes that were placed in the units. Additional or more extensive records and inventory of the wastes will provide some of this information. The impression was given that it need not involve extensive supplemental sampling to characterize the wastes.

- Could we obtain a copy of Region II's QA Manual?

  John Gorman provided his copy at the meeting for ENSR to photocopy.

- Could we get a copy of Page 9 of the closure NODs?

  Yes, however, we left the meeting without obtaining a copy.

- Why did the comments related to the Ground Water Monitoring Sampling and Analysis Plan request post-closure monitoring for clean closing units on a quarterly basis for at least three years? (This is not required by the Federal Regs.)

  John Gorman said this is EPA Region II and EQB policy for clean closure.

Our approach to closure was summarized as follows (with the corresponding responses):

- Phasing development and submission of closure plans based

upon environmental significance (e.g., oil lagoon presents clear environmental priority);

John Gorman seemed to be receptive to this approach.

- For purposes of capping, combine multiple units under one cap. This will result in the placement of four distinct cap structures addressing 10 units;

  John Gorman said it is acceptable to cap several units under a single cap.

- Where multiple units are combined under one cap structure combine those into one closure plan. Units that will be clean closed or closed in place as individual units will be addressed in individual closure plan documents;

  This would be acceptable, as long as they can be reviewed as "stand alone" closure plans not relying on other closure plans or documents to be complete.

- For purposes of groundwater monitoring, artificially circumscribe the 10 units being closed in place to create three areas to be monitored separately (i.e., each of the three will require at least three downgradient wells to satisfy minimum regulatory requirements);

  This would be acceptable.

- For immobilized wastes being left in place cover with a composite cap of two feet clay/one foot topsoil, rather than a full RCRA cap;

- For units where source removal will occur but residual soil contamination will remain, also propose composite cap;

- Any units containing buried drums will be addressed by a full RCRA cap;

    If ENSR can demonstrate that wastes are truly immobile they may consider a composite cap.

We also mentioned/discussed that there might be additional information to be gathered during the field investigation activities that would be needed to provide the required level of detail for the closure plans.

The closure discussion was concluded by stating that the new closure plans would be significantly more detailed than the previous documents and would contain detailed drawings, data and descriptive information to support the proposed closure activities.